

ABSTRACT OF THE DISCLOSURE

A method of fabricating a semiconductor device using a PECVD method is provided, which improves the adhesion strength of a deposited dielectric layer to an underlying layer and the reliability of the deposited dielectric layer. After placing a substrate in a chamber, a gas having a thermal conductivity of 0.1 W/mK or greater (e.g., H₂ or He) is introduced into the chamber, thereby contacting the gas with the substrate for stabilization of a temperature of the substrate. A desired dielectric layer is deposited on or over the substrate in the chamber using a PECVD method after the step of introducing the gas. As the desired dielectric layer, a dielectric layer having a low dielectric constant, such as a SiCH, SiCHN, or SiOCH layer, is preferably used.